

Mercury rising

Parents of autistic children are mounting a vicious campaign against scientists who refute the link between vaccines and autism. Virginia Hughes takes the temperature of the escalating debate.

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In June 2006, on the first day of the summer meeting of the Advisory Committee on Immunization Practices, more than 100 protesters crowded the sidewalks outside the US Centers for Disease Control and Prevention (CDC) in Atlanta.

Organized by a nonprofit called Moms Against Mercury, the mob was made up mostly of people who believe that thimerosal—a mercury-based vaccine preservative—is responsible for the dramatic rise in autism over the past two decades.

As Paul Offit, a vaccine expert who served on the committee, tried to make his way through the crowd, one of the protestors screamed at him through a megaphone: “The devil—it’s the devil!” One protester held a sign that read “TERRORIST” with a photo of Offit’s face. Just before Offit reached the door, a man dressed in a prison uniform grabbed Offit’s jacket. “It was harrowing,” Offit recalls.

Moms against Mercury and other such groups say that autism is triggered by the routine vaccine for measles, mumps and rubella (MMR), by the preservative thimerosal, or a combination of the two. Dozens of peer-reviewed studies and scientific panels have dismissed these links, but, galvanized by a high-profile claims trial, congressional support and a buzzing online network, this movement—informally dubbed ‘the Mercurys’—has only become more organized. The movement’s rising visibility, public health experts warn, might spur lawsuits against vaccine manufacturers and ultimately lower national immunization rates.

Offit has been a prime target of these groups for years. In 1996, after he published his first book on vaccines, he received a few negative emails and letters. But by 1999, when the controversy over thimerosal reached its peak, the harassment had “entered a darker place,” he says.

He has since received hundreds of malicious and threatening emails, letters and phone calls accusing him of poisoning children and “selling out” to pharmaceutical companies. One phone caller listed the names of Offit’s two young children and the name of their school. One email contained a death threat—“I will hang you by your neck until you’re dead”—that Offit reported to federal investigators. And he is just one of the many scientists who

refute the vaccine-autism link to endure this harassment.

“Scientists have been vilified,” says Kevin Leitch, an English blogger who once believed that vaccines caused his child’s autism and who now runs a blog, *Left Brain/Right Brain*, that focuses on “autism-related quackery.”

Mysterious origins

No one knows what causes autism. But there is evidence to suggest that there might be a genetic component. For example, identical twins are more likely to share the diagnosis than are fraternal twins. Simon Baron-Cohen, director of the Autism Research Centre at the University of Cambridge, has found that talented mathematicians are at least twice as likely as the general population to be autistic, and that mathematics students at Cambridge are more likely than other students to have a sibling or parent with autism. Baron-Cohen, whose results are in press in the journal *Human Nature*, says his observations suggest that a group of genes may code for both mathematical ability and autism.

Several teams have detected potential genetic ‘hot spots’ for autism, but the factors that influence the expression of these genes are complex, leaving much of the disorder a mystery.

What is known is that autism diagnoses across the world have skyrocketed in the past few decades. Before 1990, the reported autism prevalence in America was 4.7 out of every 10,000 children; it’s now 60 per 10,000. The Mercurys call this an ‘epidemic’ that correlates exactly with the rise in the number of vaccinations that children receive, from 10 in 1983 to 36 in 2007.

Epidemiologists say the rise in autism diagnoses is instead a result of a broadened definition of autism spectrum disorders. Children with autism are sometimes diagnosed as mentally retarded, eccentric

or socially withdrawn. In some parts of the world, autism remains stigmatized or even unknown—and thus undiagnosed.

Various factors, including changes in diagnostic practice, special education policy and even financial incentives—some US states grant Medicaid benefits to children labeled autistic, but not to those labeled mentally retarded—make the increase in prevalence look like an epidemic, says anthropologist Roy Richard Grinker, who began studying autism’s prevalence in 1994 after his daughter was diagnosed with the disorder. “But the current numbers can’t be compared to old ones—they’re like apples and automobiles,” he says.

Shot of fear

A link between autism and the routine MMR vaccine first surfaced in 1998, when British gastroenterologist Andrew Wakefield reported that of 12 autistic children he had observed, 8 had suddenly regressed into autism within days of receiving an MMR shot (*Lancet* 351,637–641; 1998). The paper set off a media frenzy, and over the next four years, vaccination rates in Britain fell from 91% to 85%. Wakefield was widely criticized for this report, and in 2004, 10 of the paper’s 13 authors retracted their conclusions (*Lancet* 363, 750; 2004).

Every large study that has looked at the incidence of autism and rates of vaccination has concluded that there is no link between the two. In 2002, a study analyzing data on more than 500,000 Danish children born between



Target practice: Vaccine expert Paul Offit has received hundreds of threatening emails, letters and phone calls.

1991 and 1998 found that those given the MMR vaccine were no more likely to develop autism than those who didn't get the vaccine (*N. Engl. J. Med.* **347**, 1477–1482; 2002). Another study in the UK of nearly 6,000 children found the same rates of vaccination among autistic children as among non-autistic ones (*Lancet* **364**, 963–969; 2004).

“There have been a variety of designs done by different investigators worldwide, with different samples and different methods,” says epidemiologist Eric Fombonne, a researcher on the UK study, “and all absolutely failed to show any association with vaccines.”

In 2004, following four years of interviews with experts and review of more than 200 scientific studies, the US Institute of Medicine dismissed any link between autism and vaccines.

The Mercurys dismiss these and other reports and argue that the only way to settle the dispute is to compare the rates of autism between vaccinated and unvaccinated children.

To that end, a nonprofit group called Generation Rescue commissioned a \$200,000 telephone survey of 17,000 children in California and Oregon. Results of the survey, released on 26 June, suggested that boys who have been immunized—with any vaccine—have a 155% greater chance of developing a neurological disorder such as autism than boys who are unvaccinated.

Mistrust and manipulation

Both the results and the methods of the poll are controversial, however. The pollers asked parents if their children had been vaccinated, unvaccinated or partially vaccinated, without defining what the term ‘partially vaccinated’ meant, or noting what specifically the children had been immunized against or when. Generation Rescue did not release analyses of statistical significance, and because the poll did not report how many people refused to take the survey, the results may have selection bias. A Generation Rescue spokesperson did not return calls made for this article.

Still, on 22 June, US Congressional representatives reintroduced a bill submitted last year that calls for the National Institutes of Health to conduct a comparative study of vaccinated and unvaccinated populations.

But epidemiologists say such a study isn't feasible, because autism prevalence rates are relatively low and rates of unvaccinated children are lower still.

“This is just political manipulation,” adds Fombonne, who says he has also received threatening emails and phone calls. “There's no reason not to trust the data that we already have.”

Trust is certainly in short supply among these

parent groups, who have repeatedly accused CDC scientists of corruption.

“The CDC has a revolving door with the pharmaceutical companies, and they're the ones setting the vaccine schedule,” says Ginger Taylor, who has an autistic son and maintains the Adventures in Autism blog, which she says receives about 500 visitors a day.

The Mercurys, too, have been accused of financial corruption.

On websites and newspaper advertisements, they tout the benefits of—and profit from—untested approaches, including hyperbaric oxygen tanks, chelation creams and testosterone inhibitors, that supposedly remove mercury and other environmental toxins from the body. “An ever-growing number of practitioners are getting aboard this gravy train because they realize it's making a lot of money,” Leitch says.

Scientists note that some chelating treatments carry the risk of liver failure and allergic reactions. In July, a UK family whose five-year-old autistic son died of cardiac arrest after a chelation treatment announced that they would sue the Pittsburgh-based doctor who had prescribed the treatment. But many parents who use the treatments say they work wonders. “They are bringing our children back to us,” Taylor says. “Some children are coming all the way back.”

Science on trial

Starting on 11 June, a vaccine court at the US Court of Federal Claims in Washington DC heard the case of 12-year-old Michelle Cedillo, who has autism and suffers from arthritis, grand mal seizures and severe gastrointestinal problems. The Cedillos are one of 4,800 families who are seeking compensation from the government for what they say are vaccine-related injuries.

The Cedillos' case hinges on a theory proposed by heavy metal toxicologist H. Vasken Aposhian, who testified on the family's behalf. Aposhian says the thimerosal in six vaccines Michelle received before she was seven months old triggered an “immune dysregulation” that nine months later allowed the weakened measles virus in her MMR vaccination to take root in her gut. Once there, he says, the replicating virus caused neurological damages and inflammation in her bowels. “These are hypotheses,” Aposhian says. “We are now in the stages of trying to find a possible mechanism by which autism is caused by the injection of vaccines.”



Conspiracy theory: Parents of autistic children say scientists are hiding evidence that vaccines cause autism.

The trial concluded on 26 June but deliberations by the three ‘special masters’ who oversaw the case are expected to take at least six months.

If the special masters find in the family's favor, scientists warn, the family is likely to receive \$250,000 and paid medical expenses for the rest of Michelle's life. If most of the 4,800 cases turn out similarly, the National Vaccine Injury Compensation Program could go bankrupt.

But researchers also worry about what will happen if the Cedillos don't win. Anesthesiologist Jim Laidler, who a few years ago was “neck-deep” in alternative autism therapy for his two autistic children, has since turned to mainstream scientists' side. In 2005, after publishing a statistical paper in *Pediatrics* that rebuffed the idea of an autism ‘epidemic’, he received about 30 emails and a dozen hostile phone calls from the Mercurys, one of which he reported to the police.

“This stuff is frighteningly violent,” Laidler says. “With the Omnibus trial looking like [the Cedillos] are going to go down in flames, I would be appalled, but not surprised, to hear that some act of violence was carried out.”

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